

# RELATIONSHIP BETWEEN MTA VISUAL SCALE SCORES AND HIPPOCAMPAL VOLUME IN PATIENTS FROM THE MEMENTO MULTICENTRIC MEMORY CLINIC COHORT

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# QYNAPSE

## BACKGROUND

- A common assessment of atrophy in patients at risk of Alzheimer's disease (AD) is the use of visual rating of medial temporal lobe atrophy (MTA), such as with the use of the Schelten's scale (Figure 1).
- However, the issue of the age of the patient on MTA assessment interpretation has been raised<sup>[1]</sup>
- One of the key features in the MTA assessment is the severity of hippocampal volume (HV) loss.
- Assessment of hippocampal volumes can also be achieved by multiple automated and semi-automated quantification methods using T1-weighted MR images.

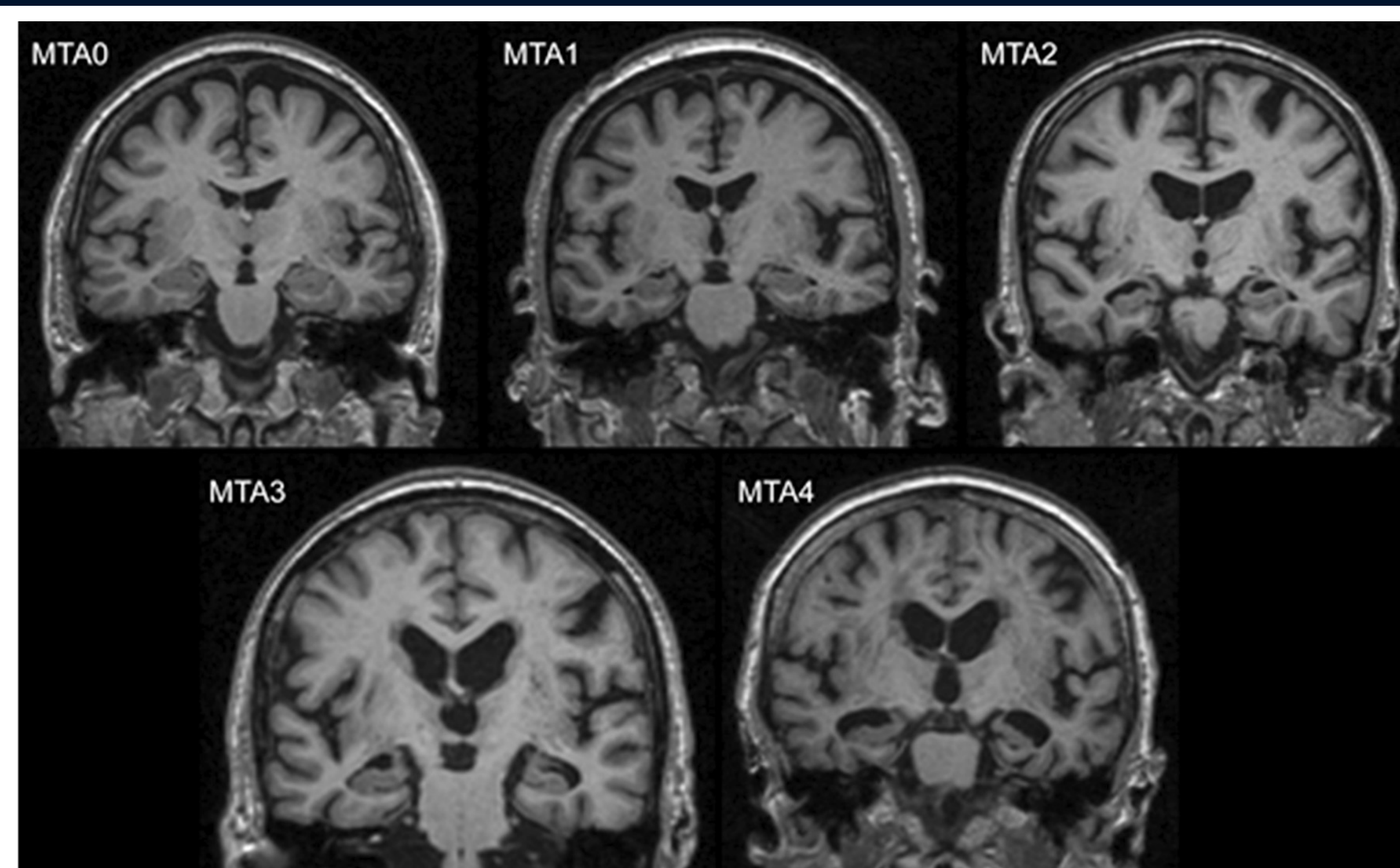


Figure 1: Examples for Schelten's MTA scale of atrophy severity 0 - 4

## OBJECTIVES

To investigate the relationship between the Schelten's MTA visual scale, hippocampal volume and an associated hippocampal z-score in the MEMENTO population using automated quantification derived from the medical device **QyScore®** an **FDA-approved and CE-marked image analysis software**.

## METHODS

- 1959** participants from the MEMENTO cohort (Age 71.02 +/- 8.61, 1218 (62%) Female, MMSE 27.95 +/- 1.91) who had undergone a 3DT1 MRI image were analyzed with QyScore®
- 814** had amyloid status from CSF or PET, of which **216** were **amyloid-positive (A+)**
- Hippocampal volumes (HV) are reported in mL, expressed as a **% of intra-cranial volume (ICV)**
- Hippocampal z-scores were calculated relative to a large normative dataset of 1290 cognitively normal individuals
- The Schelten's scale visual assessment was performed by expert neuroradiologists
- Spearman's rank correlation was used to ascertain the relationship between Schelten's MTA score, and both HV (%ICV) and hippocampal normalized z-scores

## RESULTS

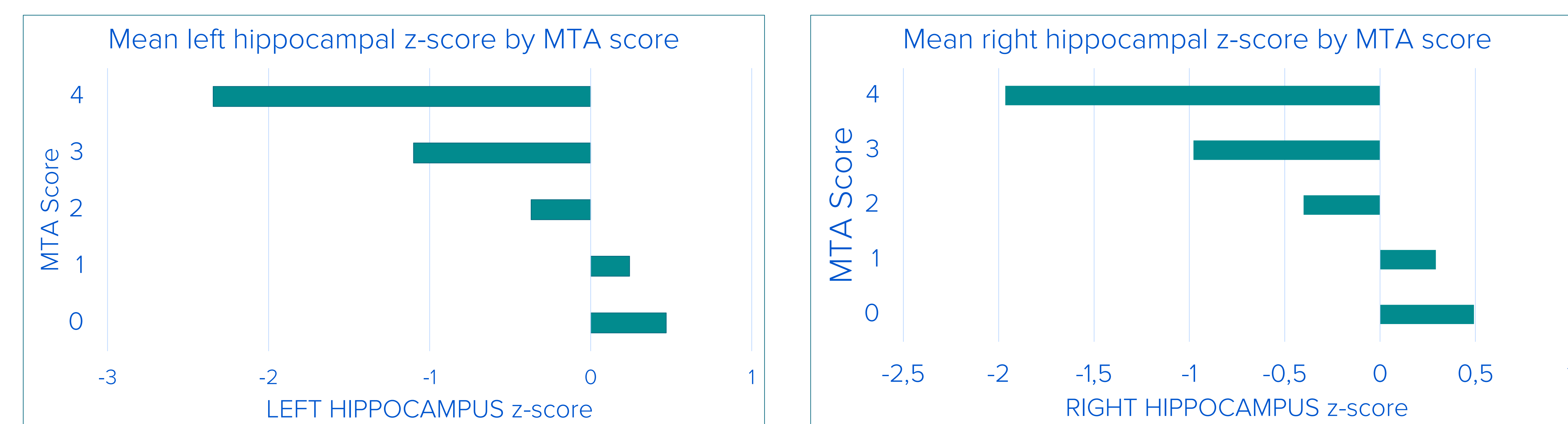
There was a **significant negative correlation (all  $p < 0.001$ )** between MTA scores and **HV in %ICV** (Left -0.62; Right -0.59) and **z-scores** (Left -0.47; Right -0.43) for the total sample (Figure 2), as well as in Amyloid+ individuals HV in %ICV (Left -0.63, Right -0.58) and z-scores (Left -0.50, Right -0.47).

Table 1. Correlation between MTA score and hippocampal volume expressed as % ICV and as normalised z-scores

	FULL COHORT	Amyloid +	SCC	MCI	Dementia
N	1959	216	305	1647	7
LEFT HV %ICV	-0.62	-0.63	-0.47	-0.60	-0.82
RIGHT HV %ICV	-0.59	-0.58	-0.50	-0.63	-0.68
LEFT HV z-score	-0.47	-0.50	-0.26	0.44	-0.57
RIGHT HV z-score	-0.43	-0.47	-0.33	-0.49	-0.65

## RESULTS

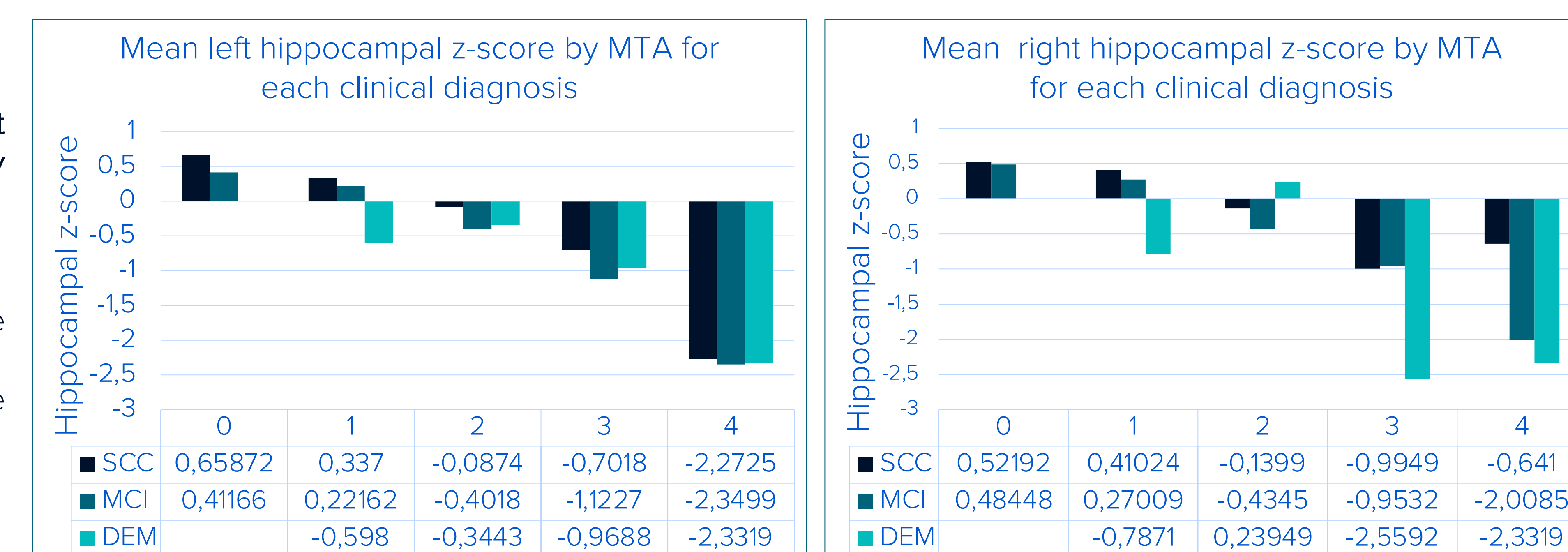
Figure 2: Correlation between mean left/right hippocampus z-scores and MTA scores



- The correlation was also significant when the sample was separated by clinical diagnosis: **Subjective Cognitive Complaint (SCC)**, N=305, Age: 69.82 +/- 8.03, 196 female, MMSE: 28.86 +/- 1.17; **Mild cognitive impairment (MCI)**, N=1647, Age: 71.23 +/- 8.71, 1018 Female, MMSE: 27.79 +/- 1.95) and **Dementia** (N=7, Age: 73.3 +/- 7.79, 4 Female, MMSE: 24.1 +/- 1.95).
- MTA scores correlated with both with **HV in %ICV** (Right= -0.47, Left= -0.50 for SCC; Right= -0.60, Left= -0.63 for MCI; Right= -0.68, Left= -0.82 for Dementia) and **z-scores** (Right= -0.26, Left= -0.33 for SCC; Right= -0.44, Left= -0.49 for MCI and Right= -0.65, Left= -0.57 for Dementia: all correlations  $p < 0.001$ ).

Figure 3: Relationship between mean left/right hippocampus z-scores by clinical diagnosis

SCC = Subjective Cognitive Complaint  
MCI = Mild Cognitive Impairment  
DEM= Dementia Patients



## CONCLUSIONS

- The automated quantification of ICV-corrected hippocampal volume and z-scores were significantly correlated to MTA scores.
- The lower correlation with z-scores stems from the additional correction for age, which is not possible to include in the MTA rating
- QyScore®** z-scores may improve specificity in patients with cognitive impairment, by providing automated quantification of hippocampal atrophy directly compared with healthy ageing.